

**SOUTHERN PACIFIC COMPANY**  
(PACIFIC SYSTEM)

**Student Course  
in Railroading**

**June 1, 1914**

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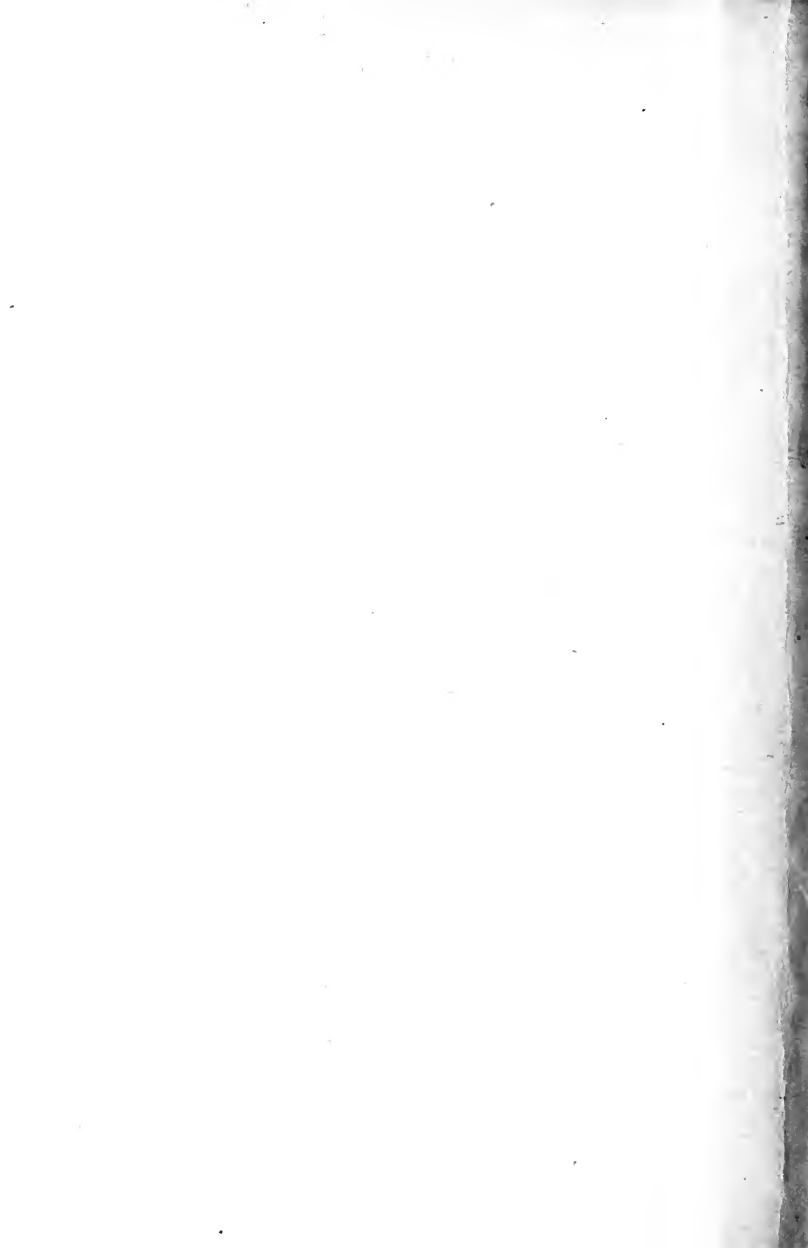


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## INTRODUCTION.

This outline of work and reading in railroading is not intended to be a complete and exhaustive study of the subject. It is rather a "laboratory" course, to fit young men to assume positions of responsibility in the management of railroad affairs, and to equip them with a working knowledge of the several departments and their inter-relation, so that they may be able to conduct the particular duties assigned to them in harmony with the scheme of railroading as a whole.

The course is so designed that the first two years will cover the entire field of railroading in a general way. Thereafter there follows one and one-half years of special work in either Operation and Maintenance, Passenger and Freight Traffic, or Accounting.

This plan has the merit of giving a general training in all of the principal departments of the railroad, and of imparting to the student the knowledge that is so necessary to conduct properly the work of any given department in harmony and in co-ordination with all the other departments.

The particular field to which the student is assigned depends upon his own inclinations, coupled with his qualifications as determined by his record and the observations of the officer in charge of students.

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# GENERAL COURSE.

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## STUDENT IN STATION SERVICE.

*First Period — Six Months.*

### A.

1. Receiving, trucking, marking and preparing freight for loading and unloading.
2. Loading and storing freight in cars; juxtaposition of different commodities.
3. Station order loading.
4. Handling of explosives and inflammables.
5. Transferring of freight.
6. Checking of errors in loading and unloading.
7. Different systems of handling freight.
8. Cost per ton of handling freight, and how affected.
9. Handling and checking baggage.

### B.

1. Placing cars for loading and unloading; importance of proper arrangement.
2. Carloads and less than carload lots, with special attention to loading cars to maximum capacity and the assigning of cars in commercial switching of such capacity as to fit as nearly as possible the shipment offered.
3. Over and short shipments; how best avoided.
4. Sealing and seal records.
5. Routing, particularly of foreign cars.

6. Demurrage charges; laws governing. State and Interstate Commerce Commission rules.

**c.**

1. Accounts and statistics. Make careful study of all forms and reports and why used.

2. Classification of freight and tariffs. Note the difference between the Western and the Official Classification. These classifications should be studied with the view of learning not only how to find and apply rates, but as well the general principles underlying the classification of commodities.

3. Filing of correspondence, etc.

4. Systematic and convenient filing of freight and passenger tariffs. It is important that tariffs be so filed that information concerning rates may be quickly and accurately ascertained, not only for your own convenience but also for the accommodation of customers.

5. Bill of Lading, Shipping Receipt, and Waybill.\*

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\* A BILL OF LADING is the carrier's receipt to the shipper for freight to be transported. The Interstate Commerce Commission has set forth the terms and conditions thereof on domestic shipments. The bill when signed by shipper and carrier constitutes a written contract.

Two forms are in common use:

First: "Straight Bill of Lading" (not negotiable), under which the shipper consigns the property straight to the consignee, the title to the goods being thus vested in the consignee. In most States, the carrier is permitted to deliver such shipments directly to that consignee (if known) without surrender of the bill of lading, or to any other party upon order of that consignee without production of the bill of lading. When the consignee is not known to the agent, the straight bill of lading is usually required as identification.

Second: "Order Bill of Lading" (negotiable), under which the shipper consigns property to his own order with instructions to the carrier to notify some other party (usually his customer) upon the arrival of the goods. The customary procedure is for the shipper to draw a draft upon the "notify" party, or customer, attaching the "order" bill of lading (duly

6. Car Records.
7. Loss and damage claims, and O. S. & D. reports; causes and remedies.
8. Per diem and car service rules.
9. Mail service.
10. Handling of train orders. (A general knowledge is all that is required at this time.) Transportation rules 201 to 223, inclusive, also 250 to 256, inclusive.
11. Ticket sales, and cashier's work.
12. Baggage records.
13. Soliciting business and representing Company.
14. Study of advertising methods.

#### **ALLOTMENT OF TIME.**

To subdivisions A and B, 3 months.

To subdivision C, 3 months.

(The work of this entire period will be done at a medium sized station.)

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endorsed by the shipper), and to transmit these documents through the shipper's bank to a bank at destination. The "notify" party is obliged to pay the draft to secure the bill of lading. The agent at destination is not permitted to make delivery without surrender of the "order" bill of lading, duly endorsed by the shipper. After such endorsement, the title to the property is vested in the holder of the "order" bill of lading. (See Accounting Department Rules 47 to 55, inclusive.)

A SHIPPING RECEIPT is a document somewhat similar to a bill of lading. It is being rapidly superseded by the uniform bill of lading, promulgated by the Interstate Commerce Commission. Usually, it bears no terms or conditions, but carries a notation that the shipment is tendered subject to the terms and conditions of the carrier's standard bill of lading, and is often exchanged at the commercial office of some interested carrier for a standard bill of lading.

A WAYBILL is the carrier's official record of freight in transit. It usually moves in the custody of the conductor along with the freight. It constitutes the shipping agent's advice to the agent at destination (or to an agent at some intermediate junction) of the shipper, consignee, marks, commodity, quantity, rate, and charges, indicating whether the charges have been prepaid or are to be collected, etc. From this waybill is prepared the freight bill against the consignee for the charges due. After the waybill has served the purpose of the agent at destination, it is sent for filing to the proper official of the Accounting Department.

**SPECIAL NOTES.**

1. Students must furnish satisfactory indemnity bond during time allotted to subdivision C. The premium on this bond will be paid by the Company.

2. During this period, too much emphasis cannot be placed on accuracy of statement and courtesy in your dealings with the public. Bear in mind that you are a salesman, and that the success of your Company depends very largely upon how you treat its customers. The public is not so well informed on railroading as you are, and apparently foolish questions are nevertheless honest. Give all the information and help you can.

3. Whenever it is possible to do so, put your dealing with a customer on a personal basis. Tell him your name and ask his; then in your subsequent conversation with him call him by name, and *pronounce the name correctly*. In correspondence, be sure to spell name of customer correctly, with correct initials and business title, if he has one.

4. Time is the essence of railroading. Have your switch lists ready for local crews doing way work. Salaries and fuel consume money very rapidly, and ten or fifteen minutes delay involves a great loss to the Company.

**READING.**

Railway Organization and Working. Dewsnap, Pages 23-36, 63-75, 113-146, 433-458, 463-487.

American Railway Transportation. Johnson. Read the

entire book, giving special attention to Chapters 9, 10, 12 and 19.

Recent pamphlets and publications of the Committee on Railway Mail Pay.

Instructions and Information on U. S. Mail and R. R. Business Mail.

Railroad Traffic and Rates. Johnson and Huebner. Vol. I, Chapters 6, 7 and 11. Vol. II, Chapters 28 to 33, inclusive; Chapters 44 to 46, inclusive.

Railway Station Service. Burt.

Freight Terminals and Trains. Droege. Chapters 2 and 9.

Economics of Railway Operation. Byers. Pages 194-209 and 513-536.

Car Service Rules and Per Diem Rules of the American Railway Association.

Accounting Department Instructions to Station Agents. (Reference only.)

M. C. B. Rules for Loading Materials.

Rules Governing Safe Transportation of Explosives and Inflammables.

Rules and Regulations of the Baggage Department.

Transportation Rules 201-223, 250-256, 916-953, 968-976, 980.

Items concerning railways in the daily press.

Make a careful study of Employees' and Public Time Tables, Official Guide and Routes.

**STUDENT IN MAINTENANCE OF WAY SERVICE.***Second Period — Three Months.*

1. Roadbed, width and slope of cuts and fills, sub-grade, ditches; method of forming embankments, culverts, drainage, destruction of weeds, fencing. (Special attention should be given to subject of drainage.)

2. Ballast, purpose, requirements; kinds of ballast and relative desirability and costs; methods of laying, cost per cubic yard and how affected.

3. Surfacing, purpose; super-elevation of curves; importance of not raising general level of track in ordinary surfacing; causes of center-binding and springy track; how avoided.

4. Ties, kinds of timber; relative cost and durability, treated and untreated; regulations and methods of laying.

5. Tie-renewals; importance of this item and best method of determining per cent. of renewals; cost.

6. Rails, weight used and how determined; rail wear, on curves, on tangents; creeping; rail-renewal, most effective organization of gang for this work; use of discarded rail; use of rail removed from main line for side tracks; transferring inner and outer rail on curves.

7. Joints and joint fastenings; relative merits of square and broken and of supported and suspended joints; theoretical requirements for a perfect joint; causes of rail joint troubles; tamping of joints.

8. Switches, split switch, stub switch, facing point switch, elements of safety and danger in each; derailling



switch and its uses; rules for laying switches. Frogs; give careful attention to the various designs for frogs, such as the spring-rail and rigid frog, and proper angle to use.

9. Tie-plates, advantages and different designs; merits and cost of each.

10. Track implements, proper care, repair and record of same.

11. Buildings, bridges, track on bridges, trestles.

12. Wrecking and emergency work, protection of trains, patrolling of dangerous track, assembling material, organization of gangs, reports and records.

#### **SPECIAL NOTES.**

1. As the work of the station represents the operation of the railroad in miniature, so the work of the section represents the work of the Maintenance of Way Department. The section is the maintenance of way unit.

2. Tie-renewals. This item is one of the most expensive in maintenance work. It will be found that section foremen, where the matter is left to their judgment, vary widely in the renewals made, even where the conditions obtaining are practically the same. A definite and well-carried out system should be pursued for the purpose of indicating when and what ties should be renewed—a matter which should not be left to the judgment of individual foremen.

3. Very diligent study should be given to the methods employed during emergencies, such as washouts, slides, wrecks, etc. Above all things preserve discipline and

organization. Do not give orders until you know the facts, and the best way to get facts is to get on the ground, if possible, and learn them.

**READING.**

Economics of Railway Operation. Byers. Part V, Chapter 2.

Elements of Railroad Engineering. Raymond. Chapters 1 to 9, inclusive.

Railroad Construction. Crandall and Barnes.

Railway Organization and Working. Dewsnup. Pages 160-174.

Notes on Track. Camp. (Reference only.)

Economics of Railroad Construction. Webb. Chapters 6, 9 and 13.

Freight Terminals and Trains. Droege. Chapter 4.

Rules and Regulations for the Maintenance of Way and Structures.

**STUDENT IN OFFICE OF SUPERINTENDENT OF  
TRANSPORTATION.**

*Third Period — Two Months.*

**A.**

1. Work of Car Record Office. Advantages and disadvantages of loose-leaf ledger and card index systems.

2. Conductor's Train and Tonnage report.

3. Interchange and Junction reports.

4. American Railway Association's Per Diem and Car Service Rules, and Master Car Builders' Association Code of Rules governing interchange and use of foreign cars and repair of same.

5. Relations with foreign roads, charges for equipment and renewals.

6. Expediting return of home cars from foreign lines.

7. Assignment of foreign cars to the best advantage in order to minimize per diem charges and to comply with Car Service rules.

**B.**

1. Systems of dispatching; Fast Freight and otherwise ("Manifest," "Time," "Preference," "Fast," etc.)

2. Car tracing; necessity for and abuse of.

3. Handling of refrigerator cars.

4. Anticipating future demands for cars by study of crop prospects, market conditions, and prices of commodities.

5. Rules and laws governing allotment of cars during

period of car shortage, with special attention to cars for interstate traffic.

6. Methods of ascertaining the available equipment on divisions.

7. Prevention of unnecessary empty-car mileage.

8. Rules and laws governing the ordering and placing of cars, demurrage, etc.

9. Handling of revenue and official special trains and private cars.

#### **ALLOTMENT OF TIME.**

To subdivision A, 2 weeks.

To subdivision B, 6 weeks.

#### **SPECIAL NOTES.**

1. The Office of the Superintendent of Transportation stands in a dual relation. It forms the link between Operating and Traffic Departments. On the one hand it performs a purely operating function in the handling of cars; on the other hand, it performs a strictly traffic function in its relation to the shipper in the allotment of cars, diverting, tracing, and keeping shippers informed generally as to the whereabouts of merchandise in transit.

The importance of these last named duties is of the very greatest. Prompt and accurate information concerning shipments is, in the majority of cases, the shipper's measure of efficient service.

2. The most important function of this office is to forecast "commodity" movements sufficiently far in advance to make sure that the equipment necessary to

handle a given movement of freight is assembled at the point at which it is needed.

3. Special attention should be given to the method of distributing cars during a period of car shortage.

4. Nothing is of more value to the Company, nothing will do more to hold trade, than to give patrons prompt and accurate information as to the location of goods in transit. This information is usually asked for over the telephone. It is over the telephone that one's voice is most likely to show impatience and irritation, and the temptation is strong to give curt answers. The telephone has lost more friends than anything else. Take special pains to be pleasant and courteous when talking over the telephone.

#### **READING.**

Railroad Traffic and Rates. Johnson and Huebner. Vol. I, Chapters 8 to 14, inclusive.

Railway Organization and Working. Dewsnup. Pages 80-112, 458-487.

Freight Terminals and Trains. Droege. Chapters 11, 15 and 21.

Study carefully the geography of the Southern Pacific System.

**STUDENT UNDER MASTER MECHANIC.***Fourth Period — Three Months.***A.**

1. Preparation and care of passenger cars.
2. Preparation and care of freight cars.
3. Car inspection; importance from standpoint of economy and safety, and with special attention to the relation of inspection to cost of repairs.
4. Rough handling and how best prevented.
5. Classification and construction of freight cars.
6. Air brakes.

**B.**

1. Engines; types and how classified.
2. Difference in design of various types of engines.
3. Purpose of different designs.
4. Repairs; principal item in cost of repairs, cost per engine-mile.
5. Total cost of operating an engine per engine-mile. Elements which go to make up this cost and how affected.
6. Fuel; elements which determine the value of any given fuel; comparison of coal and oil.
7. Proper and improper use of fuel in firing and effect upon cost of repairs per engine-mile.
8. Methods of storing fuel and accounting for same.
9. Water; importance of good water. What constitutes good water.
10. Effect of poor water on operation and repairs.
11. Methods of treating and economic results.

**ALLOTMENT OF TIME.**

To subdivision A, 1 month in car cleaning and repair yards, with assignment to wrecking crew.

To subdivision B, 2 months; one month in shops and roundhouse, and 1 month as student fireman.

**SPECIAL NOTES.**

1. The student should obtain a fair working knowledge of elementary machine design, so as to enable him to read drawings of machinery without difficulty.

2. The largest expenditure made for a single item by a railroad is for fuel. The importance of economy in its use is, therefore, *prima facie*. In this connection engine mileage and engine loading become of paramount importance. It has been aptly said that successful railroading depends upon two things: First, loading cars; second, loading engines.

3. Careful study should be made of braking apparatus. No railroad man should be without some knowledge of air brakes.

4. During his final month, the student should make an occasional trip with the Road Foreman of Engines.

**READING.**

Any standard work on Steam Engines.

Elements of Railroad Engineering. Raymond. Chapters 11, 12 and 13.

Economics of Railway Operation. Byers. Part V, Chapter 3, and Pages 492-513.

Railway Organization and Working. Dewsnap. Pages 212-263.

Economics of Railroad Construction. Webb. Chapters 7 and 8.

Rules and Regulations governing air brakes, air signals, heating and lighting passenger cars, electric and acetylene headlights.

Rules and Information on Oil Burning Locomotives.  
Charts and diagrams on air brakes published by Westinghouse Air Brake Co. or International Textbook Co.  
Federal Boiler Laws and Safety Appliance Act.



**STUDENT BRAKEMAN AND CONDUCTOR.***Fifth Period — Four Months.***A.**

1. Signals governing train and engine movements.
2. Protection of trains.
3. Coupling and uncoupling, with attention to prevention of personal injuries.
4. Switching, with attention to prevention of personal injuries.
5. Handling cars; importance of careful handling.
6. Advantageous placing of cars in train.

**B.**

1. Yard, way freight, through freight and passenger train work.
2. Handling of way-bills on freight trains and of tickets on passenger trains.
3. Conductor's records and reports.
4. Handling of train orders (to be studied from conductor's point of view).
5. Action in case of accidents.

(Student must pass a satisfactory examination on Transportation Rules, given by the regularly authorized examiner, before he will be allowed credit for this period.)

**ALLOTMENT OF TIME.**

To subdivision A, 1 month in yard work, 1 month as extra brakeman with freight crew.

To subdivision B, 2 months; 6 weeks as assistant to

conductor with freight crew, 2 weeks as extra brakeman with passenger crew.

**SPECIAL NOTES.**

1. Promptness and certainty in train movement is the essence of successful operation. Make every move count. One of the prime requisites for a successful railroad official is the ability to recognize the difference between proper and improper handling of trains.

2. "Safety First" should govern every act of a trainman. There is no class of employes of a railroad in a better position to promote safety than trainmen. Everything pertaining to the operation of trains should be made secondary to the safety of life and property. When in doubt, take the safe course.

**READING.**

Rules and Regulations of the Transportation Department.

Current Time Table.

Economics of Railroad Construction. Webb. Chapters 5, 10, 11 and 12.

Economics of Railway Operation. Byers. Part V, Chapter 4.

American Railway Transportation. Johnson. Chapters 9 and 10.

Government Ownership of Railways. Dunn. Pages 181-241.

Safety First. Bradshaw.

Accounting Department Instructions to Conductors.

**STUDENT IN ACCOUNTING DEPARTMENT***Sixth Period — Three Months.***A.**

1. Statement of gross and net tons hauled in freight and mixed trains.
2. Locomotive performance in freight service.
3. Statistics of freight train service.
4. Statistics of passenger train service.
5. Operating statistics by divisions.
6. Statistics of Maintenance of Way and Structures.
7. Statement of revenues and expenses.
8. Statement of freight earnings.
9. Statement of passenger earnings.
10. Effect on freight earnings by reason of diversions.
11. Distribution of commodities by tonnage interchange.
12. Freight interchanged with other lines.
13. Statement of estimated freight and passenger earnings.
14. Statement of business routed adversely.
15. Comparative statement of business done at agencies.

**B.**

1. Check and verification of station accounts.
2. General condition of station.
3. Payrolls and distribution of labor charges.
4. Issuance of and accounting for material.

**ALLOTMENT OF TIME.**

To subdivision A, 2 months, in general office.

To subdivision B, 1 month; 2 weeks with traveling

auditor checking stations, and 2 weeks with traveling accountant checking division accounting bureau.

**SPECIAL NOTES.**

1. It is intended that the student shall learn the sources from which are obtained the figures used to make up the statements listed above and how they are compiled.

2. The chief value of statements rendered to officials lies not in their forming a condensed compendium to which reference may be had to ascertain the total expenditures and receipts governing any given item but in affording a panoramic view of the entire situation.

That with which one is in immediate contact is likely to assume undue proportions at the expense of other things that are of vital importance.

3. There is a prevalent notion that the examination of operations through the medium of statistics will serve as a corrective of errors already committed. Post mortems never cured anything. The most illuminating thing in business is the light of experience, but it doesn't pay to waste that light looking for something that has passed into history and when found can add nothing of constructive value to the business.

In the railroad business there is a tendency for officials to burden those under them with requests for statistical *histories* of things that have happened, when what is needed is a quick and immediate application of an improvement for the future.

Statistics should be prepared to establish general

policies for future action, and they should not be abused by using them as a substitute for diligent and aggressive supervision. Calling for statistics and explanations, in supervision work, is substituting the process for the thing.

Finally, percentages, except for large numbers, mean nothing. Stale statistics are dangerous. A railroad cannot be run from an accountant's cloister.

4. Were every man inherently honest he would still be fallible, and accounting would be necessary to discover and correct his errors.

#### **READING.**

Railway Organization and Working. Dewsnap. Pages 264-384.

Railroad Traffic and Rates. Johnson and Huebner. Vol. I, Chapter 7; Vol. II, Chapter 28.

Letters from an Old Railway Official. Second Series. Hine. Letters 13, 20 and 21.

Modern Organization. Hine. Chapters 4 and 5.

How to Analyze Railroad Reports. Moody.

**STUDENT IN TARIFF BUREAU.***Seventh Period — Three Months.***A.**

1. Compilation of passenger tariffs.
2. Division of rates, "local" and "through."
3. Passenger agreements covering rates, divisions and interchange.

**B.**

1. Compilation of freight tariffs.
2. Division of rates, "local" and "through."
3. Freight agreements covering rates, divisions and interchange.

**C.**

1. Freight rate information bureau, waiting on the public.

**ALLOTMENT OF TIME.**

To subdivision A, 1 month.

To subdivisions B and C, 2 months.

**SPECIAL NOTE.**

An alert rate clerk can pick up a great deal of business. Whenever possible, put the dispensing of information on a personal basis. Don't let an inquirer go away without learning his name, if possible, and when he intends to ship, and, if at all feasible, get a routing order from him. Turn this data over to a solicitor at once.

**READING.**

Railroad Traffic and Rates. Johnson and Huebner. Vol. I, Chapters 15 to 25, inclusive.

The Working of the Railroads. McPherson. Chapter 3. Freight Classification. Strombeck.

Government Ownership of Railways. Dunn. Pages 242-302.

# Operation and Maintenance

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## FOREWORD.

Operation and maintenance represent what corresponds to the manufacturing department of any industrial concern. The number of men employed and the amount of money that must be expended in this work will vary in direct proportion to the amount of transportation that is sold.

The danger of an over-production of transportation by the Operating Department is just as real and must be as studiously guarded against as an over-production in any manufacturing institution. Under-production is no less serious. To fortify against either over- or under-production, it is necessary that the Traffic Department shall keep the Operating Department informed as to traffic conditions sufficiently far in advance to enable those who are responsible for the production of transportation to meet the requirements.

**STUDENT WITH DIVISION ENGINEER.***First Period — Four Months.*

1. Basis for distribution of charges as between betterments and additions, and operating expenses.
2. Preparation of estimates; (a) for work not included in the annual budget, (b) for work to be included in the annual budget.
3. Organization Maintenance of Way forces.

**SPECIAL NOTE.**

During this period the student should endeavor to get information from original sources. To do this, it will be advisable to spend as much time as possible on the road with the Division Engineer or the Assistant Division Engineer.

**READING.**

Freight Terminals and Trains. Droege. Chapters 1, 3, 5, 12, 16, 17, 18, 19 and 20.

Economics of Railway Operation. Byers. Parts I, II, III and VII.

Elements of Railroad Engineering. Raymond. Chapters 28, 29, 30, 31 and 32.

Railroad Construction. Webb.

If accessible, Proceedings and Manual of Recommended Practice, American Railway Engineering and Maintenance of Way Association. (Reference only.)



**STUDENT UNDER MASTER MECHANIC.**

*Second Period — Three Months.*

1. Shops and roundhouses; efficiency of, (a) as to plant, (b) as to location, (c) as to operation.
2. Organization of shop forces.
3. Distribution of labor.
4. Distribution and care of supplies.
5. Sources of expensive shop operations.
6. Shop efficiency systems.
7. Importance of the accurate checking of issues of supplies other than water and fuel.
8. Careful study of the air brake.
9. Engine failures, causes and remedies.
10. Reports, statistics and accounts.
11. Tonnage rating.
12. Effect of grades and curves on engine mileage and application of these factors to local tonnage ratings.

**SPECIAL NOTES.**

1. The student should seize every opportunity to go out on the line with the Road Foreman of Engines for the purpose of studying conditions affecting motive power.
2. Theoretical tonnage rating formulae should not be applied independently of actual working conditions. Motive power cannot be handled on paper.
3. The student must pass the regular examination provided for firemen who are candidates for road service, before he will be permitted to leave this period.

**READING.**

Review of reading assigned for Fourth Period of General Course.

The Principles of Scientific Management. Taylor.

Freight Terminals and Trains. Droege. Chapters 27, 28, 29 and 30.

If accessible, Proceedings of American Master Mechanics' Association and American Railway Master Car Builders' Association. (Reference only.)

**STUDENT IN SIGNAL DEPARTMENT.**

*Third Period — Two Months.*

1. Manual block signals, staff system, telegraph system permissive, absolute.
2. Automatic block signals.
3. Interlocking plants, mechanical, electro-pneumatic, hydro-pneumatic, all air, all electric.
4. On single track; on double track.
5. Protection of crossings.
6. Mechanism, maintenance, installation.
7. Cost of maintenance, accounts and records.

**READING.**

The A B C of Railroad Signaling. Elliott.

Elements of Railroad Engineering. Raymond. Chapter 10.

Railroad Construction. Webb. Chapter 14.

Railway Signaling in Theory and Practice. Latimer.

Railway Organization and Working. Dewsnap. Pages 196-211.

For definitions and illustrations, see Signal Dictionary, 1908 edition.

**STUDENT IN STORES DEPARTMENT.***Fourth Period — Two Months.*

1. Careful study of uses, value and proper care of Company material. This information to be gained as helper to Section Storekeeper in General Store.

2. Handling of requisitions; necessary approvals; from what data prepared; method by which stock is made available quickly.

3. Pricing; distribution of charges to various accounts; analysis and purpose of statements in connection with Stores Department.

**SPECIAL NOTES.**

1. Special attention to be given to the manner in which material is assembled and distributed during emergencies.

2. Carefully note total amount of stock and material carried and its effect on economical operation; how it can best be reduced to minimum and yet fill orders promptly.

**READING.**

Railway Organization and Working. Dewsnap. Pages 147-159.

Economics of Railway Operation. Byers. Part V, Chapter 6.

Elements of Railroad Engineering. Raymond. Pages 1-16.

Economics of Railroad Construction. Webb. Chapters 1 to 4, inclusive.

The Supply Department. Pearce.

The Truth About the Railroads. Elliott.

**STUDENT IN GENERAL MANAGER'S OFFICE.***Fifth Period — Two Months.*

The purpose of this period is to put the student in touch with organization as a whole. It is impossible for a general manager, as a rule, to come into personal contact with the multitudinous activities of a railroad. He must perforce depend to a great extent on reports from subordinate officers, and from the Accounting Department. Reports from subordinate officers are usually comparatively simple to understand. The same is not always true of operating reports compiled by the Accounting department. These require careful analysis. Their chief value lies in reflecting well, or poorly, balanced relations between the operations of the several departments.

In addition to the interpretation of statistical statements, the student will be afforded an excellent opportunity to get a general knowledge of the entire organization of the Operating Department, and should inform himself thoroughly as to the organization of his own road and make comparisons with the organizations of other roads.

It is the general manager who is responsible for the greater proportion of the expenditures. Hence, it is the Operating Department of the service that must bear the brunt of a retrenchment order. It is, therefore, important that the Operating Department be so organized that it may be quickly expanded or quickly contracted, to meet the fluctuations of business,

The business of the Operating Department is to manufacture transportation; the business of the Traffic Department is to sell transportation. These two functions must be evenly balanced, otherwise it is manifest that there must be waste.

**READING.**

Railroad Administration. Morris.

Modern Organization. Hine.

The American Transportation Question. Dunn.

Government Ownership of Railways. Dunn. All portions not previously assigned.

Freight Terminals and Trains. Droege. Chapter 8.

Interstate Commerce Act, and amendments in effect.

**STUDENT WITH TRAINMASTER.**

*Sixth Period — Five Months.*

**A. WITH YARDMASTER.**

1. Make-up of yard; purposes and uses of several groups of tracks.
2. Switching.
3. Weighing.
4. Make-up of trains: first, as to safety; second, as to destination; third, as to contents.
5. Necessity for care in handling cars.
6. Causes of unnecessary switching, and how avoided.
7. Loading of engines to full tonnage rating.
8. Special attention to methods of clearing blockades.
9. Yardmaster's records.
10. Yard expenses per freight car handled; how affected.

**B. WITH DISPATCHER.**

1. Systems of dispatching: Double order, "31" order, "19" order, and staff system, and relative merits of each.
2. Different forms of train orders and their uses.
3. Handling trains, importance of economy of time in making meets.
4. Importance of familiarity with length of sidings, grades, etc.
5. Knowledge of capacity of engines. Effect of train resistance.
6. Chief causes of delays, and various methods of overcoming same.
7. Work on time-table charts.
8. Balancing of traffic.

9. Dispatcher's records and reports.
10. Time-keeper's duties.

**C. WITH TRAINMASTER.**

1. Expedition of car movements, and distribution.
2. Handling of fast and slow freight, with reference to necessity and competition.
3. Full loading of cars and engines.
4. Education of station agents in the matter of full loading of cars, prevention of delays, maintenance of neat yards and stations.
5. Cutting down over-time ; how best accomplished.
6. Balancing of way-work between crews.
7. Investigation of delays.
8. Enforcing operating rules.
9. Efficiency tests.
10. Clearing wrecks.
11. Carrying out of the Division's policy.
12. Disciplining of employes.

**ALLOTMENT OF TIME.**

To subdivision A, 1 month.

To subdivision B, 1 month.

To subdivision C, 3 months.

**SPECIAL NOTES.**

1. Keep posted as to actions taken by officials in cases of emergency, accidents and the like. There is nothing more important than quick and considerate action in cases of emergency ; the proper care of passengers in accidents. The public will not be charitable towards your shortcomings, and it will many times occur that upon a single act of yours, at the time of an accident, the



entire management of the road will be praised or condemned. Earn and keep the good will of the public by giving every assistance you can consistently.

2. Special attention should be given at all times to the diplomatic handling of men. Men will have all sorts of grievances, real and imaginary, and it makes no difference how thorough a knowledge you may have of a subject, unless you are able to maintain pleasant relations with the men under you and still be absolutely fair and impartial, you are a failure.

3. After the completion of this period the student will be placed wherever it may appear necessary, in the judgment of the management, to give him further instruction in order to prepare him for promotion to a permanent position.

#### **READING.**

Rules and Regulations of the Transportation Department.

All wage schedules and agreements between Company and employees.

Freight Terminals and Trains. Droege. Chapters 6, 7, 10, 13, 14, 22, 23, 24, 25 and 26.

Economics of Railway Operation. Byers. All portions not previously assigned.

Elements of Railroad Engineering. Raymond. All portions relative to economics of railroad operation not previously assigned.

Economics of Railroad Construction. Webb. All portions relative to economics of railroad operation not previously assigned.

Railway Organization and Working. Dewsnup. All portions not previously assigned.

American Railway Transportation. Johnson. Review entire book.

Letters from an Old Railway Official to His Son. First and Second Series. Hine.

How to be a First Class Trainmaster. (Pamphlet.) Ry. Age Gazette.

# Traffic

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## FOREWORD.

As the Operating Department is the department of manufacture, so is the Traffic Department that of salesmanship. It is also the price-fixing department, determining the rates at which transportation shall be sold.

An eminent railroad executive has compared the development of our present systems of rates to that of the English common law. They grew up with conditions just as the common law did, and they will go on growing and requiring change from time to time just as the common law of England has required modification by statutory enactment in order to adapt it to modern needs. The making of rates requires profound knowledge of industrial conditions and of the sources and volume of traffic. It cannot be learned in a day. The student is advised to study carefully current decisions of Interstate and State Commissions with respect to rates and fares.

Competition by slashing rates is a thing of the past. Railroads today attract and hold their patronage through service. Unless the Operating Department is prepared to render that service, the Traffic Department cannot maintain pleasant and cordial relations with the Company's patrons.

# Passenger and Freight Traffic

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## PASSING REPORT CLERK AT GATEWAY JUNCTION POINT.

### *First Period — Three Months.*

The student is put in this particular position for the sole purpose of affording him an opportunity to learn geography, what products are characteristic of different parts of the country, what commodities move into and out of the various localities, *when and how* these commodities move.

A traffic man must keep posted on crops and financial conditions all over the country. The "Monthly Summary of Commerce and Finance of the United States," issued by the Department of Commerce and Labor, is a very valuable source of information for this purpose and the student should acquire the habit of consulting it.

During this period no special reading is assigned. It is most imperative, however, that the student become thoroughly familiar with the resources of the territory covered by the lines of his own company.

It is only by keeping well informed on such matters as these that he will be able to anticipate "commodity" movements, and make proper provision for handling them.

At the conclusion of this period, the student will be given an examination, based upon the Official Railway

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Guide, covering railroads and steamship lines, to test his knowledge of "transportation" geography.

**READING.**

It is recommended that the student provide himself with a standard commercial atlas.

**STUDENT IN PASSENGER TICKET OFFICE.***Second Period — Five Months.***A.**

1. Information Bureau.

**B.**

1. Ticket salesman, local.
2. Ticket salesman, interline.

**ALLOTMENT OF TIME.**

To subdivision A, 2 months.

To subdivision B, 3 months.

**SPECIAL NOTES.**

1. Neatness and courtesy go hand-in-hand with alertness and efficiency. There is no business in which they are of such paramount importance as in the passenger business of a railroad. The man who is engaged in this work is paid to be pleasant; it is as much a part of his duty as to make out a ticket correctly. A man is likely to work, think and act as he dresses.

2. In every case where it is possible, the making of an inquiry or the purchase of a ticket should be made a personal transaction. Make the patron feel that he is dealing with a man, on a man-to-man basis, and not with an impersonal corporation.

3. Information is frequently asked for over the telephone. It is over the telephone that one's voice is most likely to show impatience and irritation, and the temptation is strong to give curt answers. Thoughtless and cantankerous answers over the telephone have cost the

railroad many a friend. "A soft answer turneth away wrath." Too great pains cannot be taken to speak pleasantly and courteously, when talking over the telephone.

**READING.**

Railroad Traffic and Rates. Johnson and Huebner. Vol.

II. (Read entire volume very carefully, re-reading such portions as are applicable as work of period progresses.)

The Truth about the Railroads. Elliott.

Government Ownership of Railways. Dunn.

**STUDENT SOLICITOR IN LARGE CITY.***Third Period — Four Months.***A.**

Acting as Assistant to Chief Clerk in the office of District Freight Agent.

1. Office methods.
2. Districting of territory.
3. Methods of keeping check on business of shippers.
4. Handling correspondence concerning "tips" on prospective business.
5. Relations with representatives of other lines.

**B.**

Collecting data from shippers requested by the Traffic department.

**C.**

Solicitor in a regularly assigned district.

**ALLOTMENT OF TIME.**

To subdivision A, 1 month.

To subdivision B, 1 month.

To subdivision C, 2 months.

**SPECIAL NOTES.**

1. Pride and confidence in the thing one sells is a sure road to success. It is a fundamental error to overlook small details. Courtesy, personal appearance, accuracy of statement, pleasantness of address, and, above all, sincerity, are the things that make for good salesmanship.



2. A thorough-going knowledge of the business in all its details lends a facility in the selling of transportation that can be gained in no other way. It is important that one should know about his competitors and their activities, but it is more important that he should avoid disparagement of his competitors. To belittle, ridicule, or underestimate a competitor is folly, and only tends to weaken one's own position.

**READING.**

Railway Transportation. Raper.

The American Transportation Question. Dunn.

## **STUDENT DISTRICT FREIGHT AND PASSENGER AGENT.**

### *Fourth Period — Six Months.*

#### **A.**

General office work and records.

Special attention should be given to the handling of correspondence. The writing of letters should receive diligent study. Directness, brevity, courtesy, and clearness are the essentials of good letter writing.

#### **B.**

Traveling Freight and Passenger Agent.

The work of this subdivision should be done under the direction of the District Freight and Passenger Agent, and should be of such a character as usually devolves upon a Traveling Freight and Passenger Agent.

### **ALLOTMENT OF TIME.**

To subdivision A, 2 months.

To subdivision B, 4 months.

### **SPECIAL NOTES.**

1. Remember always that you are a public servant. The public will not be charitable toward your shortcomings, and it will many times happen that on a single act of yours the entire management of the road will be either praised or condemned. Earn and keep the good will of the public by the efficiency of the service rendered.

2. The men under your supervision as well as patrons will have all sorts of grievances, real and imaginary, and it makes no difference how thorough a knowledge you may have of traffic matters, unless you are diplomatic and

are able to maintain friendly relations with the Company's patrons, and make the men under you feel that they will be treated with absolute fairness and impartiality, you are a failure.

3. After the completion of this period, the student will be placed wherever it may appear necessary, in the judgment of the management, to give him further instruction in order to prepare him for promotion to a permanent position.

**READING.**

Railroad Freight Rates. McPherson.

American Railway Transportation. Johnson. Chapters 10, 19 and 20.

Elements of Transportation. Johnson.

# Accounting

## FOREWORD.

Accounting should never be an end in itself. Its proper and most efficient sphere is as a means to an end. It should be an integral and working unit in the machinery for producing transportation. There has grown up a feeling that in Auditors, as they are mis-called, inheres a greater degree of honesty than in other employes. The result has been that there has developed a defensive attitude on the part of that great body of men outside of the Accounting Department. This fact should be constantly kept in mind by the student in railroad accounting, for it is evident that the effectiveness of an accounting department as an aid to conducting the business of transportation will always be in inverse ratio to the extent to which this attitude exists.

The chief and most important function of accounting is a historical one—the recording of operations and transactions. The principal value of such data is as an aid to constructive criticism. You will note that the word “aid” is used. In and of themselves, accounting data, apart from immediate supervision, are useless. Supervision, in order to be effective, must be at close range. So accounting should never be remote, but should go *pari passu* with the actual work that is being done. Otherwise the statistics are stale. Stale statistics are about as trustworthy for a railroad man as a block signal that gives a false indication.

**STUDENT WITH AUDITOR OF FREIGHT ACCOUNTS.**

*First Period — Three Months.*

**A.**

1. Abstract Bureau; agents' accounts.
2. Hollerith Machine Bureau.
3. Revising Bureau.
4. Interline Accounts Bureau.

**B.**

1. Statistical Bureau.

**ALLOTMENT OF TIME.**

To subdivision A, 2 months.

To subdivision B, 1 month.

**READING.**

The Railway Auditor. Whitehead.

Modern Accounting. Hatfield.

Accounting and Auditing. Cole.

**STUDENT WITH AUDITOR OF PASSENGER ACCOUNTS.**

*Second Period — Three Months.*

1. Local Bureau.
2. Conductors' Bureau.
3. Home Interline Bureau.
4. Foreign Interline Bureau.
5. Statistical Bureau.
6. Miscellaneous Bureau.

**READING.**

The Working of the Railroads. McPherson. Chapters 4, 5 and 6.

Government Ownership of Railways. Dunn.

The Truth About the Railroads. Elliott.

**STUDENT IN DIVISION ACCOUNTING BUREAU  
AT DIVISION HEADQUARTERS.**

*Third Period — Six Months.*

**A.**

1. Classification of Accounts as prescribed by the Interstate Commerce Commission.

2. Accounting Department Circular No. 25.

3. Labor and materials distributions.

4. Preparation of department invoices, department bills, bills collectible, and vouchers.

5. Abstract of debits and credits to operating expenses, including preparation of Form 4904, Division Report to Accounting Department of Operating Expenses.

6. Register of debits and credits to Operating Expenses and other accounts, including preparation of Monthly Account Current and statements to accompany same.

**B.**

Review of subdivision A with particular reference to Motive Power Department accounts.

**ALLOTMENT OF TIME.**

To subdivision A, 5 months (The student will be transferred to another division at the end of his second and fourth month.)

To subdivision B, 1 month, at general shops.

**SPECIAL NOTE.**

The Division Accounting Bureau represents, as far as

such accounts are concerned as originate under the jurisdiction of the division superintendent, the Accounting Department in miniature. It is an effort to decentralize accounting to the end that the superintendent may have immediate access to all figures affecting the operation of his division. The work is still experimental, and for this reason the student is urged to give it special attention.

**READING.**

Interstate Commerce Commission Classification of Accounts.

A Treatise on the Law of Carriers. Moore.



**STUDENT WITH AUDITOR OF DISBURSEMENTS.***Fourth Period — Three Months.***A.**

## 1. Voucher Bureau:

- (a) Examining bills payable as to distribution to accounts.
- (b) Registration of bills payable and department bills.

## 2. Motive Power Bureau:

- (a) Distribution of cost of locomotive repairs.
- (b) Distribution of cost of fuel and other supplies for locomotives.
- (c) Examination of preparation of statistics of freight and passenger trains.

**B.**

## 1. Appropriation Bureau:

Preparation of records and exhibits in connection with charges to Additions and Betterments and Construction Accounts.

## 2. Statistical and Special Accounts Bureau:

- (a) Preparation of statistical exhibits.
- (b) Checking balances with Division Accounting Bureaus.

**ALLOTMENT OF TIME.**

To subdivision A, 6 weeks.

To subdivision B, 6 weeks.

**READING.**

Railroad Finance. Cleveland and Powell.

Current Reports and Rulings of Interstate Commerce Commission affecting accounting.

**STUDENT WITH AUDITOR OF EQUIPMENT SERVICE  
ACCOUNTS, MISCELLANEOUS ACCOUNTS, ETC.**

*Fifth Period — Three Months.*

**A.**

Auditor Equipment Service Accounts:

1. Locomotive and Car Mileage Bureau.
2. Tonnage Bureau.
3. Statistical Bureau.
4. Per Diem Bureau.

**B.**

Miscellaneous Accounts:

1. General Accounts.
2. Station Accounts.
3. Bills collectible.
4. Dining car and hotel accounts.
5. Other accounts.

**ALLOTMENT OF TIME.**

To subdivision A, 6 weeks.

To subdivision B, 6 weeks.

**SPECIAL NOTE.**

After the completion of this period the student will be placed wherever it may appear necessary, in the judgment of the management, to give him further instruction in order to prepare him for promotion to a permanent position.

**READING.**

A general review of the reading.

# General Information

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## INSTRUCTIONS TO STUDENTS.

1. The work of the several periods must be pursued in the order outlined, unless special permission has been obtained to deviate therefrom.

2. Students will provide themselves with books referred to under the head "Reading" for each period as rapidly as needed, and will be examined thereon at the conclusion of each period by the officer in charge of students. (For purposes of review, the reading is here and there repeated.)

3. Each student must be a regular subscriber to at least one railroad publication of recognized merit, and certify to such fact in his first monthly report.

4. Students will report in writing on the first day of each month to the officer in charge of students.

This report must be a full and comprehensive review and criticism of work and reading done during the preceding month.

Students should not hesitate to criticise adversely, commend, or suggest improvements. It should be remembered, however, that destructive criticism without the recommendation of something better, is nothing more than fault-finding, and, as such, accrues not to the benefit of the writer.

5. All correspondence should be addressed to the officer in charge of students.

6. Students will give notice to the officer in charge of students and to the head of the department in which employed, one month before the completion of any period, of the date such period will be completed.

7. Students will be graded on the basis of their monthly reports and reports of them given by their superior officers. In passing on reports, grammar, phrasing and general literary structure will be taken into consideration.

8. Students will be subject at all times to the rules governing the particular work at which they are employed, and shall report to and be subject to the discipline of the officer in charge of any given department in the same manner as other employes connected therewith.

9. Students shall be on duty during the entire working time of the month. All reading must be done outside of working hours.

10. Whenever lectures are being given by the official examiner of employes in train service, all students in the locality where such lectures are in progress must be in attendance, reporting such fact to the officer in charge of students.

#### **INSTRUCTIONS TO OFFICERS.**

1. Officers under whom students are assigned for service will see to it that students are given opportunity to pursue the work substantially in the manner and order indicated, unless special permission has been secured by a student to do otherwise.

2. It should be borne in mind that students are carefully selected men and capable of engaging actively in the work and assuming responsibility for the accomplishment of some portion of it. Nothing strengthens a man like responsibility.

3. All rules governing employes engaged in work of the same kind must be enforced as to students. Any infraction of the regulations in which the discipline would result in the dismissal of the party involved must be similarly dealt with in case of a student.

4. In the event of the dismissal of a student from the service, the proper ranking officer will notify the officer in charge of students, giving date of dismissal and reasons therefor.

5. Officers having proper authority will issue to students assigned under them quarterly passes good on their respective divisions, whenever the duties of the student are such as require such transportation. A rather liberal policy will be followed with respect to the issuance of trip passes, as students are expected to make traveling over the Company's lines a part of their education.

6. Upon the completion of a period by a student, the head of the department, or the superintendent of the division, under whom the period was taken, will render to the officer in charge of students a confidential report, giving his personal estimate of the student and his opinion as to whether or not he could develop into an efficient railroad official. This estimate should be based on personal observation and examination of the student

at the conclusion of the period; when this is not possible, upon reports from subordinate officers.

7. Officers will grade students in accordance with the scheme indicated under head of "System of Grading Students," transmitting such grade with report required under paragraph 6.

8. Officers must consider students, while under their jurisdiction, in all respects a part of their own staff of employes and will be held responsible for the proper carrying out of the provisions of this course.

#### **SYSTEM OF GRADING STUDENTS.**

Students will be graded as follows:

Grade 1—Between 95% and 100%. Very rare and exceptional ability.

Grade 2—Between 85% and 95%. Work, reports, application to duty, ability to learn and general effectiveness, very satisfactory.

Grade 3—Between 75% and 85%. Work, reports, application to duty, ability to learn and general effectiveness, good, but could be improved without requiring "very rare and exceptional ability."

Grade 4—75% and under.

A student receiving an average grade of 4 for any period will be dropped from the student roll.

The numbers 1, 2, 3 and 4 only will be shown in markings by officials making reports.

**WAGE SCHEDULE.**

Students will be paid in accordance with the following schedule:

**GENERAL COURSE — 24 MONTHS.**

1st Period,	\$75	per month.
2d     "	75	"     "
3d     "	80	"     "
4th    "	80	"     "
5th    "	80	"     "
6th    "	85	"     "
7th    "	85	"     "

**OPERATION AND MAINTENANCE — 18 MONTHS.**

1st Period,	\$90	per month.
2d     "	90	"     "
3d     "	95	"     "
4th    "	95	"     "
5th    "	95	"     "
6th    "	100	"     "

**TRAFFIC — 18 MONTHS.**

1st Period,	\$90	per month.
2d     "	90	"     "
3d     "	95	"     "
4th    "	100	"     "

**ACCOUNTING — 18 MONTHS.**

1st Period,	\$90	per month.
2d     "	90	"     "
3d     "	95	"     "
4th    "	97	"     "
5th    "	100	"     "

The salary of the student will be at the rate as here set forth, for the period in which he is actually engaged,

regardless of the order in which the course may be pursued.

#### **PAYROLL.**

Students will be carried, as "Students in Railroad-ing," on the regular payrolls of the head of the department in which employed, and on the payroll provided for employes engaged in the same kind of service. The rate of pay is to be as provided under the head "Wage Schedule."

#### **EXPENSE ACCOUNT.**

Personal expense accounts will be allowed where the duties of the student are such as ordinarily carry an expense account.

Such expense accounts must be approved by the head of the department in which the student is employed, and handled in the same manner as provided for the student payroll.

Expenses incurred in transferring from the assignment of one period to that of another will be allowed; such expense accounts to be approved by the officer in charge of students.

#### **RELIEF FROM STUDENT SALARY AND EXPENSE ACCOUNT CHARGE.**

The salaries of students and their expense account allowances will not be charged to the particular department in which they may be employed. The head of the department will obtain relief from such charges by charging the same off to "Other Expenses," a subdivision



of the account known as "General Expenses," as provided for by the classification of the Interstate Commerce Commission; or in such other manner as may be specifically instructed by the Accounting Department.

### **APPOINTMENTS.**

Any single man between the ages of 21 and 30 years who is an employe of this Company is eligible to appointment to a studentship.

In the making of appointments, personal address, temperament, habits, length of service, and education will be considered.

It should be understood, however, that the appointment to a studentship does not carry with it a promise or an obligation on the part of the Company that the appointee will receive an official position upon the completion of the course. A student who has been graduated from the student class will be given preference in the filling of a vacancy, provided he is temperamentally fitted to meet the peculiar conditions of the position.

### **APPLICATIONS.**

Applicants must state age, postoffice address, whether married or single, address of parents, present occupation, educational qualifications, date graduated from institutions of learning, and degrees, if any; detailed account of railroad experience; and give at least three, but not more than five, references to persons not in the employ of the Company who are in a position to give testimony as to ability and moral character.

Applicants must obtain and submit with their applications the endorsement of their superior officers.

Applications should be addressed to the officer in charge of students.

**CREDIT ON COURSE OF STUDY FOR EXPERIENCE.**

Appointees who have had experience in railroading or technical training which, in the opinion of their superior officers, covers the work outlined for any one or more of the periods of this course of study, will be allowed credit on account of such experience and the course shortened accordingly.

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- Government Ownership of Railways.* Samuel O. Dunn. D. Appleton & Company. New York, N. Y.
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- How to Analyze Railroad Reports.* John Moody. Analyses Publishing Co., 35 Nassau St., New York, N. Y.
- The Working of the Railroads.* Logan G. MacPherson. Henry Holt & Company, New York, N. Y.
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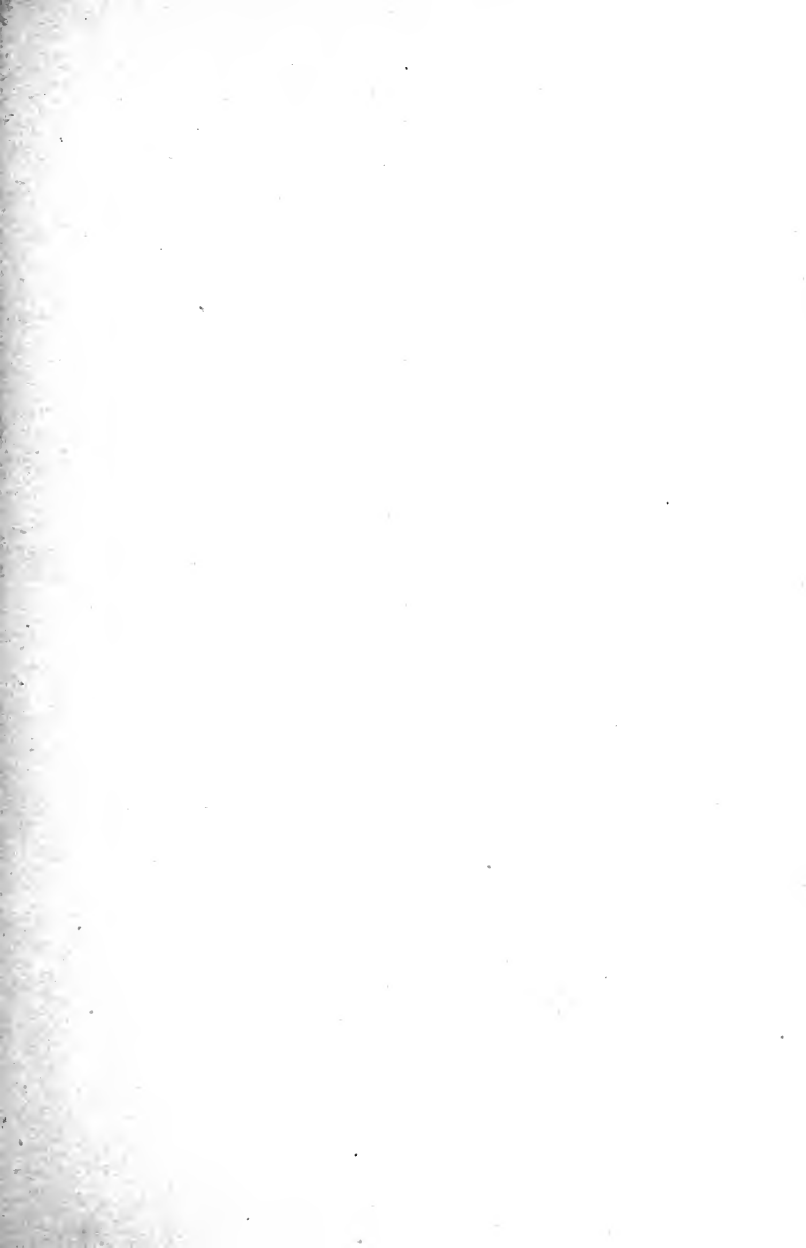
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